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MEDICAL ADVISORY COMMITTEE

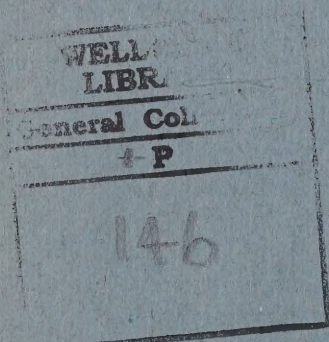
MESOPOTAMIA ENQUIRIES

Report on Lines of Communications

(SHEIKH SAAD TO ~~AMARA~~)
BASRAH

November 1916





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MEDICAL ADVISORY COMMITTEE.

MESOPOTAMIA ENQUIRIES.

Report on Lines of Communication, Sheikh Saad to Basrah, November 1916.

To

SURGEON GENERAL F. H. TREHERNE, C.M.G.,
DIRECTOR, MEDICAL SERVICES,
INDIAN EXPEDITIONARY FORCE "D".

SIR,

We beg to report that on completion of our inquiries at the front (3rd Indian Army Corps), we have visited various points on Lines of Communications between Sheikh Saad and Barsah, including Ali Gharbi (November 7-8), Amara (November 9-30) and Kurna (December 2-5); also the 13th Division (November 22) and the Cavalry Brigade Camps above Amara, together with smaller camps and some marching posts along the Tigris.

In each instance we have discussed sanitary and preventive measures on the spot with the officers concerned before leaving the area, and, where necessary, we have left written memoranda with the Assistant Director of Medical Services or Senior Medical Officers concerned. Copies of some of these memoranda are annexed to this report.

GENERAL REVIEW OF PRESENT POSITION.

2. This extensive section of Lines of Communication is of great importance as regards prevention of disease, not only among the troops going up to or returning from the front and the local garrisons, but also among the large labour forces now being used on works of construction by the river and railway. Many sanitary problems are presented also by the frequently close association of the troops with Arab populations, and especially by the occupation of the town of Amara.

3. As regards actual disease, the month of our inspections, November, is a healthy one in Mesopotamia and the troops seen by us on Lines of Communication have shared the general improvement in health and condition to which, with its causes, we referred in our report on the forces of the 3rd Indian Army Corps. We are not in a position to give statistics of recent sickness in this section. In any case interpretation of such statistics as regards infectious and epidemic diseases would be extremely difficult on account of the great fluctuations of the military population and the fact that men who contract infection within the area may not take ill until they are clear of it. Generally speaking, the amount of sickness from all causes seems still to be in itself considerable, though light relatively to that of the summer months. Inquiries at the Amara hospitals and at field ambulances showed that intestinal diseases (dysentery, colitis and diarrhoea) has been responsible for a large proportion of total sickness, both British and Indian (see *e.g.*, Appendix 8, analysis of cases in two British and two Indian hospitals). Diseases of the enteric group have also been widely and continuously prevalent, though no extensive local epidemics have been reported. "Sandfly" fever, so called, has rapidly diminished. Septic sores or trench sores have been common, and some return of jaundice has been noted. Scurvy in the large majority of cases has occurred in Indian troops returned from the front, seldom in those who have been posted all the time on Lines of Communication. There have been no cases so far of louse borne disease, and (save at Kurna) we heard of no extension of the plague which has been present at Basrah. A few sporadic cases of cholera have occurred including a small group of some 10 cases on the B. E. Echelon marching between Basrah and Amara in October.

4. Taking the Lines of Communication section as a whole, it should be said at once that preventive work is making active progress in many directions. Hospitals have made, or are completing, satisfactory arrangements for the reception of cases of infectious disease; the laboratory facilities have been overhauled, so as to increase their utility in the present and provide for expansion on pre-arranged lines when more men and laboratory equipment are available. Assistant Directors, Medical Services, and Senior Medical Officers and the specialised sanitary officers are working hard to consolidate sanitary measures in their areas, and to keep abreast of the new sanitary requirements which arise daily from the movements of troops or the increase of local labour. Some redistributions of personnel and areas of work have been made which enable more time to be given to these duties. New sanitary sections have been sent to Amara and Sheikh Saad with good results, and, elsewhere, existing sanitary sections have been strengthened. The "Sanitary Committee" attached to General Headquarters has disappeared as a unit, but the majority of the officers on the Committee have been continued in the "Basrah Central Laboratory," where their recent work has included valuable inspections on special matters along Lines of Communication up to Amara, *e.g.*, purification of water and malaria prevention.

5. We found the Commandants of the principal centres (including Colonel Sullivan, who took up duty as Commandant, Amara, whilst we were there) active in promoting measures of sanitary improvements in their areas. Progress in this matter has also been accelerated by the greatly improved transport arrangements. The past three months has been a period of incessant activity along the Lines of Communication in every direction, and the developments which have taken place in special departments, such as Works, Royal Engineer, Supply and Transport, Inland Water Transport, etc., have been greatly to the good as regards sanitation. We had every assistance in our inquiries from officers of these departments, and were glad to note their willingness to take action when matters affecting the health of the troops were brought to their notice. With few exceptions the same applied to Officers in Command of the different units visited.

6. On the other side of the scale, only two considerations need, we think, be mentioned. The first is that in some cases (particularly in connection with the smaller posts and marching posts—see below) sanitary measures had been taken much too late. The second is that, both in fighting and in labour units, we found too many instances in which sanitary questions seemed to have been regarded, without sufficient cause, as extra duties which could be postponed for convenient opportunities and at any time be set aside for other work. The Army cannot of course be kept free from preventable disease by mere intermittent interest in sanitation in off seasons. On settled lines of communication, at any rate, the satisfactory provisions of elementary necessities of sanitation for the men should be as insistent a daily duty as giving them sufficient wholesome food. The position of sanitary officers who represent these matters to other departments fully burdened with work, or to officers in charge of units is often not enviable: persistence and firmness are however necessary, but have not always been in evidence. There should be no hesitation either in replacing those who fail to exercise these qualities or in supporting those who find that ordinary personal communications have produced no effect and that formal action is necessary to obtain essential sanitary requirements or enforce sanitary discipline.

ARRANGEMENT OF NOTES BELOW.

Below are appended.—

1. Some local notes—

Sheikh Saad.

Ali Gharbi.

Amara.

13th Division Camp, Amara.

Kurna.

Marching posts.

2. Observations as to Laboratory arrangements; Hospital Notes; Dysentery; Enterica; Malaria and continuance of Quinine; Scurvy; Supplies and Rations; Supply of Sweepers; Civil Dispensaries.
3. Notes for telegraphic summary.
4. Acknowledgments.
5. Appendices.

1.—SOME LOCAL NOTES.

REVISIT TO SHEIKH SAAD.

7. In returning through Sheikh Saad (November 6th) we conferred with the Assistant Director of Medical Services, Lieutenant-Colonel Goodbody, as to matters raised in our report of October 10th on this place. Satisfactory progress had been made. The new laying out of certain of the camps and hospitals and the concentration of latrine areas with provision of large covered incinerators were great improvements. Material was still lacking for ablution places, cookhouses and roofed latrines; designs are ready for their construction as soon as this arrives. The hospital personnel has done good service by giving spare time to making bricks for use in sanitary construction generally. Suggestions made in our report as to protection of water-supply and other matters had been given effect to; the insanitary area by the bridgehead post was stated to have been thoroughly dealt with; a British Sanitary Section, recently arrived, was getting into work. The Clayton disinfectors asked for had not arrived; it is important that they should be expedited. For laboratory arrangements at Sheikh Saad, see below.

ALI GHARBI.

8. Here there were some 200 British and 2,000 Indians including defence troops, Sappers and Miners, Inland Water Transport Staff, two sections of the 102nd C. F. A., supplies and various details. For tactical reasons the camp was about to be moved wholly to the right bank of the river. The new site is worse as regards levels and proximity to native populations; on the other hand the ground surrounding the site on the left bank was foul and had produced many fly nurseries, so that the move may not be without sanitary advantage. We went over the old and new ground with the Senior Medical Officer, Captain Evans, I.M.S., and have since heard from Lieutenant-Colonel Goodbody, as to the matters to which we drew attention. The following seem to be outstanding points. (a) The area inside the new perimeter must have surface drains leading to sump pits which are pumped out over the bund into the Tigris. In view of the approach of wet weather, it would be well to ascertain if the pumps have now been supplied, and expedite them if necessary. (b) The larger number of ration animals which are sometimes driven into the perimeter is liable to cause considerable manure nuisance, and to meet this and to prevent other possible accumulations of litter, open cone incinerators would be useful.

The arrangements of the 102nd C. F. A. were excellent and good work was being done by Captain Evans at the civil dispensary (see below).

9. Ration cattle seen, were in some cases very emaciated and in others the appearance of the animals suggested an acute infectious disease from which several were dying. We telegraphed on the matter to the D. D. V. S. who has since reported on the subject.

AMARA.

10. Amara required some little time. It is the great hospital centre above Basrah, and also has become a most important and rapidly developing secondary base for the troops at the front in regard to supplies, shipping, and other matters. It contains in addition the advanced depôts, British and Indian, and garrison troops; quarters for General Headquarters Staff were being provided. There were also various problems of sanitation in the town,

in which are numerous billets and military quarters. The railway from Kurna had just been completed and trains were beginning to arrive. The railway, the new docks and landing places, and other works involved the importation of labour corps on a considerable scale. At the time of our visit the 13th Division was in camp a mile or two above Amara; its departure began before we left. The Assistant Director of Medical Service, Amarah, Lieutenant-Colonel Stone, R.A.M.C., consulted us on many questions which were then pressing for solution and placed all information on medical and sanitary matters unreservedly at our disposal. Our thanks are particularly due to him and to Major Dunbar Walker, D.A.D.M.S., Sanitary (with whom we made detailed inspections of all parts of the area), for the trouble taken to facilitate our inquiries.

The attached memoranda (Appendices 1 to 8 of this report) were made at the time and copies given to the Assistant Director, Medical Services. They cover a large part of the ground and few additional notes are here necessary.

WATER SUPPLY AND SODA WATER.

11. That obtained from the shallow wells by the side of the Chahala and on the right bank of Tigris is reasonably satisfactory. The wells ensure a good filtration of the river water: the arrangement of the wells and the well-compounds was very good, while chlorination is carefully attended to. Completion of the "Tigris Front" piped water supply from the left bank at the earliest possible date is very desirable, especially in the interests of the hospitals (Appendix 4).

The soda water factory on the left bank has to deal with a decidedly dangerous raw water. The present practice is to treat with a bleaching powder solution calculated to add 0.4 parts per million of free chlorine to the water (20 minutes) as compared with 0.8, or a higher figure, elsewhere in Amara. It was claimed that the complete safety of 0.4 parts had been sufficiently demonstrated by results of examination of certain samples sent to the Central Laboratory, Amara. Major Mackie, Officer Commanding of the Laboratory, however, did not consider that the good results obtained in the few casual samples submitted to him were enough to decide this question. It was agreed to defer comment on the matter until officers of the Central Laboratory, Basra, had been consulted. This we have done. We do not consider there is sufficient experimental evidence to warrant continuance of 0.4 and think that the working minimum should be 0.8 here as elsewhere.

DISPOSAL OF EXCRETA, SULLAGE WATER AND SURFACE DRAINAGE.

12. The large sugar loaf incinerators, which are now striking feature of Amara, appeared to work well. Suggestions were made to prevent the dangerous practice of first mixing up the excreta from latrines with bhusa or dried litter and then leaving the mixture near the incinerators, exposed to flies until it is convenient to burn it.

Various matters coming under this head are dealt with in Appendix No. 3 which records the results of a conference with officers concerned on November 18th. Since then we have been informed that the projected "Sanitary Tramway" is being put in hand, and that the special tanks for this railway had arrived in Basrah. This tramway system is intended to meet winter and wet weather conditions and its completion is consequently pressing.

WORK OF SANITARY SECTIONS.

13. This was being reorganised in consequence of the recent arrival of No. 100 British Sanitary Section. The general line of its work, as arranged by the Assistant Director, Medical Services, is indicated in paragraph 9 of Appendix 7. Perpetual and systematic sanitary inspection is one of the great needs of Amara, and it should be facilitated by these arrangements.

MUNICIPAL ADMINISTRATION.

14. Some suggestions made and adopted in this matter are noted in Appendix 7, paragraph 7. A capable man to act as British sanitary inspector is greatly needed, and we trust that this can be arranged.

15. Here and in other places our opinion was asked as to the extent to which local "Notables" should be brought into the sanitary administration of the town. While it may be very necessary and politic to consult these Notables and to inform them beforehand of the intentions of the Military Governor in regard to sanitation, we would deprecate anything of the nature of Town Councils in which the Notables have direct or indirect opportunities of blocking progress. The civil medical officer, responsible to the Military Governor, should be the executive sanitary officer. Occasional conferences on sanitary matters with the commandant, Assistant Director, Medical Services, Assistant Director of Works etc., would be useful, but the practical value of such conferences would almost certainly be diminished by the presence of Notables, and it seems better that it should be left to the Military Governor to decide the occasions on which native opinion should be ascertained and the way in which this should be done.

CAMPS, BILLETTS, HUTMENTS, ETC.

16. The sanitary condition and arrangement of some of these were excellent, and we would specially commend the British Advanced Dépôt in this connection. Others left a good deal to be desired: an extreme case, on which we separately reported, was the camp of the 72nd Coy. R. E. (Appendix 2). Action was taken by the Deputy Assistant Director, Medical Services (Sanitary), in these cases.

The immediate environments of the camp frequently needed more attention than the camps themselves: at least two instances came to our notice where British units were suffering from considerable prevalence of diarrhoea and colitis apparently due to infection from faecal accumulations just outside the camp (see observations as to flies, etc., below).

HOSPITALS.

17. Matters relating to the Amara hospitals are dealt with in Appendix 4. Since it was written, the Deputy Director, Medical Services, Line of Communications, consulted us as to the proposals for increasing the accommodation, for officers suffering from dysentery or enterica. The "Gorrington" hospital for officers, on the left bank, will, we understand, be opened for surgical or general cases, and officer cases of the diseases in question will in ordinary circumstances be accommodated at the officers' wards on the right bank. This solution promises to meet the cases satisfactorily. We would specially commend the gardens made, at No. 12-I. S. H., No. 21-I.G.H., and the Indian Convalescent Dépôt, from which a most useful supply of vegetables for hospital use was obtained.

18. *Additional Visiting Physician.*—Colonel Willcox, A.M.S., acts as Consulting Physician for the whole section of the force which is in and beyond Amara, and visited Amara for a few days whilst we were there. It was represented to us that (specially in the British hospitals) there is need, in addition, for a visiting physician stationed at Amara:—a senior officer of authority with large experience in tropical diseases, who would visit all the hospitals, take men over the diagnosis and treatment of their cases, and give systematic instructions in diseases with which Medical Officers from home are necessarily unfamiliar.

In Alexandria similar work has been carried out this year by Colonel Sandwith, with the greatest benefit, and Amara is not behind Alexandria in its present importance as a hospital centre. If the sick in Mesopotamia are to be given every chance of recovery, hospital Medical Officers must have practical clinical instruction in modern methods of diagnosis and treatment of common tropical conditions such as malaria, heat stroke, liver abscess, the dysenteries, cholera, plague, etc. Moreover there are undoubtedly Medical

Officers in charge of hospital wards whose clinical methods and practice need to be brought up to the mark.

Those who urged this appointment were feeling the need strongly and we attach great weight to their opinion. From what we have ourselves seen we are convinced of its importance, and recommend that steps should forthwith be taken in India to obtain the services of a physician of standing (for example Colonel Sutherland, I.M.S., Professor of Medicine and Principal of the Medical College, Lahore, if he were willing) for the work indicated.

19. *Other matters investigated at Amara.*—(Laboratories, supplies, special diseases, etc.) are referred to in the second part of this "report."

CAMP OF 13TH DIVISION, AMARA.

20. Appendix No. 6 gives notes on our inspection of this camp on November 22nd. Copies were sent on November 26th to the Assistant Director, Medical Services of the Division. We think that more attention should have been given to the disposal of litter and horse manure (paragraph 4 of Appendix 6) when the camp was established. Had this been done, much annoyance and danger from flies, both to the 13th Division and to their neighbours, might have been prevented, and the objectionable dumping into the Chahala (which was ultimately prohibited) need not have taken place. We represented in these notes the great advantage of field cookers for British units and trust it will be possible to supply them (paragraph 5). It would be well if better methods for cleaning food utensils, etc., were secured in this Division (paragraph 2).

KURNA.

21. At the date of our visit, Kurna contained, in addition to a garrison of the 44 Marwaris, some 700 men of Porter and Labour Corps (shortly to be increased), Inland Water Transport Staff, railway workers, a considerable Supply and Transport Dépôt, a section of No. 57 C.S.H., a rest camp, and various details. These are quartered in tents or huts in the angle formed by the junction of the Tigris and Euphrates, which includes the native town and various scattered Arab villages or compounds, and elsewhere consists largely of a date-palm area intersected by irrigation channels. Larger marching echelons, passing through, occupy ground outside. Much of the Kurna area is normally under water when the rivers are high. The place is at present of considerable military importance from its situation, though for some purposes it will become less so when the Amara to Kurna Railway is continued to Basrah.

22. Much has been done since Kurna was occupied to improve its sanitary conditions. Quite recently a Commandant, Kurna, has been appointed, and at the date of our visit the S. M. O., Major Browne, I. M. S., O. C. 57 C.S.H. was about to be relieved of hospital work and become Deputy Assistant Director, Medical Service (Sanitary), for Kurna and for the posts up the Tigris as far as the Amara command. Major Browne accompanied us over the area, and we were shown the plans of the new projected camping and hutting ground for the rest camp, labour and railway corps, hospital and Supply and Transport dépôt. Only a portion of these changes of site can be effected before the rainy season. The hospital (57 C. S. H.) must meanwhile stay on its present site, the ditches of which will gradually fill with sub-soil and river water. Provision against flooding was, however, made here, and in other respects the arrangements of the hospital, considering the drawbacks of the site, were very good. Since the end of October a considerable number of cases of diarrhoea have been treated; most of these have not been severe and have returned to duty from Kurna: 26 cases of dysentery had been admitted in the last fortnight.

23. The following are noteworthy points:—

- (a) *Use of Kurna by troops.*—The place has an unenviable notoriety for malaria, although its spleen index is not specially high. Failing wholesale clearance of date-palms and the filling up of irrigation channels on a large scale it is certain to remain malarious. Kurna should as far as possible be avoided as a station for troops or as a camping place for echelons passing through—especially from March onwards, when anophelines will increase.

- (b) *Anti-malaria precautions.*—The place has been fully reported on, as regards malaria, by Major Christophers. We think that before the spring, anti-malaria work should be definitely organised; an officer should be detailed to supervise and arrange quinine prophylaxis—including administration of quinine to troops passing through Kurna and to see to the supply and proper use of mosquito netting. Although the task of controlling mosquitoes seems at the moment impossible, much would be gained by using a small squad of four or five men, under this officer's supervision, to deal with those breeding places where larvicides can be effectively employed and to utilise larvivorous fish whenever feasible.

Something might also be done in the way of ridding tents and hutments of mosquitoes, and especially of infected anophelines, by daily and systematic spraying. The special fluid recommended and used by Giemsa for this purpose is not available but, in all probability, Lefroy's anti-fly solution is as lethal to mosquitoes as it is to flies. We think its culicidal properties should be determined and, if found satisfactory, that it should be used in the fly sprays as an anti-mosquito measure.

- (c) *General sanitary work.*—The Commandant, we understand, is asking that the existing squad (14 sweepers and 3 bhistis) should be increased, say, to a half sanitary section. This would ensure some British orderlies for the inspection of camps and supervision of incinerators, latrines, etc., while the Section could on occasion be sent to posts up the river and railway for special work. The need for such work was obvious in many places, and we think that the increase of sanitary personnel proposed will be necessary to aid the new Deputy Assistant Director, Medical Services (Sanitary). We drew attention to the fouling of the Euphrates foreshore by the Arabs and suggested the provision of a definite area for their use, together with policing. Arrangements should be made to obtain information of the occurrence, and as far as possible of the causes, of all deaths in the native population. A few cases of plague have occurred and the river traffic with Basra makes renewed importation of this disease probable. Measures for catching and destroying rats should be pressed. Considering the small size of Kurna we think that the civil sanitary work of the town will most conveniently be undertaken by the Deputy Assistant Director, Medical Services (Sanitary) and not by a separate officer. Certain Arab compounds close to the hutments—particularly that adjoining No. 57 C. S. H.—should be removed if possible: their proximity entails much danger from flies, and risk of plague should it become prevalent. The question of a piped water supply has lately been reported on by Captain Morison (Basra Central Laboratory). Pending this or another scheme (*e.g.*, use of one of the filtering and chlorinating barges which are coming out) more tanks, iron or tarpaulin, but in any case covered, are necessary on the Tigris side.

MARCHING POSTS AND CAMPING GROUNDS BY THE TIGRIS.

24. These posts are strung out between Basra and the front, and each consists usually of a small garrison, a rest camp in readiness for a force of 200, supplies, signals, etc. Some include a portion of a field ambulance; some others have a British or Indian Medical Officer or an assistant surgeon. We visited a post coming under the Assistant-Director, Medical Services, Amara, and others under the Senior Medical Officer, Kurna. We have since seen recent reports on the sanitary condition and requirements of some of these posts made by Captain Morison of the Basra Central Laboratory.

25. We were forced to conclude that the sanitary condition of many of these posts was until lately very unsatisfactory, and we ourselves noted much room for improvement at the dates of our visit, particularly at No. 1 post (under Amara) and at Sakricha post (under Kurna). The ground

immediately surrounding the perimeters was badly fouled from various causes ; flies were numerous, incinerators unsatisfactory, while the areas outside the perimeter which had been occupied by larger marching columns were covered with old and recent litter. At Sakricha some portions of the force were still without latrines ; and insanitary conditions were increased by the dumping of refuse and defaecation in the numerous borrow pits left by the side of the railway. Tanks of chlorinated water (for the garrison and rest camp, not for the larger marching columns) are now generally installed and the treatment of the water has been regularised. But in the months in which these marching posts were mainly used the supply of treated water seems frequently to have been deficient. Under such conditions troops following each other at these posts must have been exposed to considerable risk of infection, and instances of such infection having occurred came to our notice at Amara hospitals and elsewhere.

26. Improvement in the conditions of these posts has been actively taken up by the Deputy Director, Medical Services, Lines of Communication, and the Assistant Directors, Medical Services, concerned. We are informed that disciplinary action was taken in certain instances by the Inspector General of Communications. Some of these posts presumably will be used to a comparatively small extent during the next few months. It seems important that in future arrangements for posts of this kind :—

- (a) The post should have additional water storage, *e. g.*, tarpaulin tanks, from which on emergency a temporary supply of treated water can be given to larger echelons or bodies of troops camping outside the perimeter.
- (b) For such troops also, cooking, latrine, and incinerator areas should, wherever possible, be definitely marked out beforehand. It would be well to have a few open cone incinerators in suitable positions outside each perimeter, available at any time for burning litter or refuse. If they are damaged when out of use they can easily be repaired or replaced. The Officer Commanding of every column coming to the post should be met by the sanitary officer or his representative and the arrangements of the post indicated to him, or this should be done through the commander of the post.
- (c) Portions of sanitary sections and men from Labour Corps should when necessary be sent up to posts which have rapidly to be got into good sanitary condition.
- (d) A systematic inspection of posts by a senior sanitary officer, such as that lately made by Captain Morison, should be continued, and will be specially important at the beginning of the spring.
- (e) At malarious posts such as Ezra's Tomb or Sakricha the preventive measures adopted should include those referred to for Kurna in paragraph 23 (b) above. A survey of some of the posts has been made by Major Christopher and guidance given to medical officers on local anti-mosquito work.
- (f) Medical officers should give special attention to the rations of garrisons at these posts. In the absence of inquiry important articles like green vegetables or ration animals may be omitted from the diet although they are obtainable if suitable representations are made.

II.—GENERAL OBSERVATIONS.

27. In our report on Sheikh Saad (October 10th) we urged the necessity of installing a fully equipped bacteriological laboratory at the earliest possible moment as practically no bacteriological facilities were available and the lack of them was keenly felt. We understand that it is proposed to send to Sheikh Saad one of the complete equipments cabled for from England and that already a full time bacteriologist Captain Macalister, I. M. S., has been allocated to the area.

28. When this laboratory has commenced operations, it is most important in the interest of uniformity in bacteriological routine, and in the interpretation of results for practical working purposes that it, as well as the Corps laboratory, should keep in close touch with the bacteriological centres in Amara. To secure this, we have in our memorandum on Bacteriological Facilities in the Amara area (Appendix 5) made recommendations with regard to (1) enlargement of the sphere of work of the Director of the Central Laboratory at Amara, and (2) the routine to be adopted in the bacteriological diagnosis of enterica and dysentery.

29. In the further interest of uniformity in laboratory practice on the Lines of Communication we would advise that the services of Lt. Boulenger, the protozoological expert now occupied at No. 3 British General Hospital, Basra, on work suggested by the Committee, be utilized for the purpose of giving demonstrations and advice at Sheikh Saad and the laboratories along the line on the important matter of identifying intestinal protozoa, with special reference to amoebic dysentery.

30. At Amara, the general work of the laboratories was looked into by Lt.-Colonel Ledingham and Lt.-Colonel Wenyon, and assistance was given at the Central Laboratory, where also a series of demonstrations on intestinal protozoa was given to the local pathologists.

The memorandum in Appendix 5 gives our views as to the bacteriological requirements of this centre. We have suggested that part of the time of the Director of the Central Laboratory, Amara, should be utilized to co-ordinate bacteriological work of all the laboratories in and above Amara, to collate bacteriological statistics especially of enterica and dysentery, and to prepare in advance for the suitable accommodation and working of the new laboratories allocated to this area. We trust that this important extension of Major Mackie's work can be speedily authorised and set going. We propose to report later on equivalent arrangements which seem desirable at Basra and which would, with those at Amara, complete the excellent Laboratory schemes which the Director of Medical Services is bringing into operation.

HOSPITAL NOTES SENT ON WITH PATIENTS.

31. We found it necessary (Appendix 7, paragraph 5) again to draw attention to the necessity of sending with the transferred patient, all available notes including temperature charts, clinical and bacteriological data, etc. All the documents belonging to any one case should be carefully pinned together and enclosed in an envelope which is entrusted to the patient.

32. We have observed that the hospital notes at present sent with convoys on P. boats vary greatly in value even in the case of patients transferred from the same hospital. One Medical Officer for example sends excellent notes with his cases while another Medical Officer from the same hospital sends scrappy and useless notes or no notes at all.

In transferred dysentery and enterica cases particularly, it is most desirable that concise and relevant clinical notes of the course of the disease should be sent along with the bacteriological data available. We have observed in many cases of transferred enterica, the absence of clinical notes and only a reference to the performance of certain Widal tests. The latter in cases inoculated with the triple vaccine are usually incapable of interpretation (see below). It is all the more necessary therefore that *full clinical notes and temperature charts* should be sent down with the transferred case along with the bacteriological data (Isolation from blood, faeces or urine in T. A. B. cases and Widal tests in addition, only in men giving no record of inoculation with T. A. B.) With regard to dysentery cases, *notes of previous treatment should always be included* along with data as to the naked eye, microscopic and cultural examination of the stools.

33. In consultation with the Assistant Director, Medical Services, Amara, we prepared memoranda (Appendix 1) regarding:—

- (a) Collection of material for laboratory examination and laboratory indications for treatment, and

- (b) Precautions against infection in hospitals. These were circulated to hospital medical officers and laboratory officers in Amara. Copies have since been forwarded by the Director, Medical Services, to Basra for similar circulation there.

34. In a note to the Director, Medical Services, of November 18th, we drew attention as follows to the importance of some better understanding as to the use of the terms "dysentery" and "colitis" respectively :—

"We do not suggest an absolutely hard and fast rule in the matter, but we think that cases in which the Medical Officer has satisfied himself from inspection of the stools that the patient is passing blood and mucus should, in all ordinary circumstances, be recorded as dysentery, not merely as colitis. On this basis, when a case is transferred (*e.g.*, from field ambulances to base hospital) with the diagnosis of dysentery, it is desirable that the notes accompanying the patient should show, *inter alia*, whether the stools were examined at the transferring hospital, and blood and mucus actually observed.

We understand that in slight cases of dysentery the word "colitis" is frequently preferred, in the belief that the use of the term "dysentery" would be incompatible with the speedy return of the case to duty. This seems a mistaken view. In Mesopotamia at present the predominating form of dysentery, bacillary dysentery, is met with in all degrees of severity; there are many mild cases among them soon cured by early and appropriate treatment. Dysentery does not in this respect differ from other infectious diseases, diphtheria or measles for example, where, for purposes of prevention, administration, and working statistics, it is important that the nature of the milder case should be recognised, and not obscured by the use of other descriptive terms."

35. In base hospitals there is advantage in allotting, where possible, a special ward or wards for the observation and treatment of cases of diarrhoea. This was done with good results at No. 42 I. G. H., Amara.

ENTERICA.

36. At Amara, while pressing early diagnosis by blood culture and (to the extent that present laboratory facilities allow) by recovery of the organism from the excreta, we advised caution as to diagnosis based on Widal tests in cases giving a record of inoculation with T. A. B. vaccine. We consider, indeed, that in such cases Widal tests should be abandoned altogether. (Appendix 5). Our views on these points might, we suggest, be communicated to hospitals and laboratories generally.

MALARIA: CONTINUANCE OF QUININE AFTER CONVALESCENCE.

37. A great many relapses of malaria have occurred. In this connection we think it would be well if every man discharged to duty from hospital or convalescent camp after a malarial attack was personally advised as to the continuance of his quinine, and given a paper which would be an authority to the medical officer of his unit to give him the necessary quinine on application.

In ordinary cases it is very necessary that quinine should be given in gradually lessening doses for a period of three months from the time of the initial attack. For example, supposing the patient has already spent a month under treatment in hospital, he may be given ten grains daily throughout the second month and 5 grains a day during the third month. As an alternative a more intensive quinine therapy than is usually employed may be instituted during the hospital period, with the view of getting wholly rid of parasite and thereby preventing relapses which are such a common and troublesome source of invaliding and inefficiency.

SCURVY.

38. Some mild cases of scurvy were seen in men who had not left the base or lines of communication; their number, however, was very small in comparison with the cases which had come down from the area at the front. Data have been collected as to some of these cases, and as to dietary, for future comparison with the conditions in the 3rd Indian Army Corps, on which we have reported.

The comparative absence of actual scurvy originating on line of communication should not cause any relaxation of efforts to keep Indian troops and followers well above the scurvy line. Some instances were met with, mainly detached post, but occasionally in battalions or other larger units, in which the food being taken was deficient in meat and in any kind of fresh vegetables or fruit. Sometimes this was due to failure of transport, but in other cases it appeared that vegetables or perhaps meat up to the sanctioned scale could have been obtained if the drawing of the supplies had been sufficiently seen to (Appendix 7, paragraph 13). The Officers Commanding, Supply and Transport depôts, informed us that in the case of some units it is exceptional for any officer (including quartermaster and medical officer) to make inquiries of them regarding food supplies, or for any officer to go to the depôt to check the drawing of the rations of his unit. There seems room for improvement in the amount of attention given in some Indian units both to the nature of the rations drawn and the way in which they are utilised.

39. Pyorrhœa may predispose to scurvy by interfering with mastication, and it is important to treat this condition as far as possible. This appeared to be done effectively at No. 42 I. G. H. by trimming the gums with knife or scissors, application of carbolic acid and the use of a mouth wash of salt and alum ($2\frac{1}{2}$ grains of each to 1 oz.)

FOOD SUPPLIES AND RATIONS.

40. With the exception above indicated, food supplies appeared to be good and the rations usually kept up to the authorised scale. There were deficiencies in certain items at Amara, readily explicable in the circumstances at the time and obviously only temporary. There is general difficulty, however, in obtaining sufficient ration sheep for Indian troops during the period that these animals are in lamb. Major Watts, A. S. C., and Captain Sherrard explained to us methods of local growing and purchase of vegetables which are being developed in Amara, and which are already giving a much more regular supply to troops in the Amara area. Fresh vegetables were being sent up river twice weekly from Amara to the troops at the front; there should shortly be a larger supply which could be got forward if a few tugs were available. We understand these have been applied for; in view of the importance of getting fresh vegetables to the troops at the front the supply of these tugs or some other suitable and regular means of expeditious transport is of much importance.

41. We were shown in several places *ghi* which had been badly watered (*cf.* report on 3rd A. I. C., paragraph 79). As this relatively expensive Food-stuff is obtained in large tins (35 lbs.) it would seem practicable to require some marks on the tins by which responsibility for adulteration can be brought home to the right quarter.

42. A rum ration, by the winter scale, can be issued only on the sanction of a Divisional or higher Commander. It was represented to us that occasions may arise when the issue of rum to a unit would be useful, but a Divisional Commander's order cannot be obtained until the occasion is past. We think in such circumstance authority for the ration might be given by the S. M. O. concerned.

SUPPLY OF SWEEPERS.

43. The whole system of disposal of human excreta in the force, both British and Indian, is based on incineration and on latrines contrived for the incineration method. It thus depends on the Indian Sweeper, and it was alarming to be told, as we frequently were, that the supply of Indian sweepers available for Mesopotamia is nearly exhausted, and that units are frequently short of their proper sweeper strength, and cannot get the deficiency made up by the 3rd Echelon. We have conferred with Lt.-Col. Campbell, Officer Commanding, 3rd Echelon, on this question. It is satisfactory to learn authoritatively that, owing to active measures recently taken in India, the apprehension of shortage of sweepers is now groundless. It is also evident

that, with negligible exceptions, all units are at present up to their sweeper establishment. Allegations to the contrary are probably due to a misunderstanding of the establishment allowance, or to incomplete use of the weekly field form B.-213 on which the 3rd Echelon administration is based.

44. As deficiency of sweepers has so often been advanced to us as an excuse when latrines or incinerators were found unattended to, the question naturally arises whether the establishment strength, when fully maintained, is really large enough. Subject to what is said below, we think it is, provided that the sweeper can be kept to the essential work of latrine sweeper. We draw attention in this connection to the abuse of the service of sweepers, by employing them to pick up refuse thrown about the lines, which was noted in our report on the camp of the 13th Division (Appendix 6, paragraph 1); similar abuses are too often met with, even in hospitals. As regards litter, we believe it is correct that the removal of horse or cow-dung can be done by the highest caste Indian without prejudice to his caste, and there is no sort of objection, so far as prestige is concerned, to European soldiers doing this also.

45. A real shortage, however, may occur as a result of the exceptional requirements of a locality (*e.g.*, a rapidly growing labour area) or of the scattering of sections of the unit over a number of small posts, each one of which must, for efficient sanitation, have its latrine sweeper and incinerator. We understand that in any case it is useless to apply direct to 3rd Echelon for sweepers in excess of establishment; the necessities of the case must, as soon as possible after they have been brought to the notice of the Assistant Director, Medical Services, be put up to the Army Commander for sanction to an increased local reserve sweeper staff. We think this procedure should be better understood by sanitary and other officers than it appears to be at present. We have no reason to anticipate that sanction would be withheld in such special cases, and, doubtless, arrangements have been or will be made to secure that such applications are dealt with expeditiously at headquarters.

FLY PREVENTION.

46. Our inspections in this section were made in November. Some places were relatively free from flies; in many cases however they were present in considerable abundance, notably in the camp of the 13th Division at Ali Gharbi and certain posts. Fly prevention was discussed with the medical officers in all such cases.

47. The impression that human faeces dropped on the surface of the desert are of no consequence as regards the breeding of flies is widespread, but it cannot be too well known that in Mesopotamia, say perhaps in the hottest months, this is not the case. Larvæ and pupæ have often been found in or on the soil beneath the dried faecal "shells" which, owing to larval action and to desiccation, are often all that is left of the original deposits; this has lately been again demonstrated by Lieut. Grove, of the Basrah Central Laboratory, who attributed much of the fly prevalence met with on the Nasarieh line of posts to breeding from human excrement lying on the surface.

48. More use might be made of ordinary coarse fish netting hung over the openings of tents, huts or mess rooms and weighted along the foot. This method is extensively and successfully used in Egypt to exclude flies.

49. When large open air fly traps are used they should conform strictly to the approved pattern and some one man should be told off to see to the working of the trap, to bait it daily and ensure that it is placed in the best position. Where the sides are of calico, this should be stretched taut. Fly traps properly attended to have proved very useful in many places. A common catch at 23 British Stationary Hospital, Amara, in November was 12,000 flies a day and as many as 10,000 have been taken in a couple of hours (see memorandum on Fly Traps circulated by the Assistant Director, Medical Services (Sanitary)).

50. A definite decrease in flies has now set in, and it is to be expected that they will shortly practically disappear for the winter. So much stress is now rightly laid on the agency of the fly in the production of disease that there is some danger that less attention will be paid to the satisfactory disposal of excreta and refuse during the coming months, on the ground that this is of little consequence in a fly-free season. This contention, however, is essentially unsound under ordinary conditions of life in camps or billets, for there are many ways, apart from flies, in which infection may be conveyed to food or directly to the mouth as a result of faulty conservancy or of the fouling of the ground in the neighbourhood of a camp.

At the present time it is very important that shortly before the fly season again arrives, say in March, special inspection should be made in and about all camps and hutments to deal effectively, to the greatest extent possible, with all potential breeding places for flies and with all practices which will increase their prevalence.

CIVIL DISPENSARIES.

51. Besides the civil dispensary started in Ali Gharbi (already mentioned) we visited similar dispensaries at Amara (Captain Winder, R. A. M. C.) and Kurna. The two last are maintained by municipal funds, but draw on the army for their medical officer and, by arrangement, on army medical stores. They were all doing very good curative work, and apart from their humanitarian aspect, are of much value in the prevention of disease, as they bring to light the existence of infection among the Arab population, and invest the British medical service with local prestige which helps in sanitary administration.

EPITOME OF REPORT FOR USE IN TELEGRAPHIC SUMMARY.

52. Medical Advisory Committee report on inspection November along Lines of Communication Sheikh Saad to Basrah, including 3 weeks at Amara. No conspicuous epidemics, prevalence generally of dysentery, chiefly bacillary, colitis, diarrhoea and enterica—No typhus or relapsing and few cases only cholera and plague which under control.

Committee's inspections thorough. Local questions dealt with at time of visit and memoranda left with Assistant Directors, Medical Services, thereon. As a whole preventive work active and rapid progress being made. Report includes following:—

- (1) *Local*.—Amara—speedy completion Tigris front piped water-supply and sanitary tramway for winter important. Undesirable at present stage to place sanitation in hands of municipal councils. Vigilant sanitary inspection of camps and surroundings being organised and must be maintained. Hospitals excellent. Advise obtaining from India a visiting physician for Amarah hospitals with authority and experience tropical diseases. Kurna should be avoided as far as possible as station for troops after March—Special anti malaria measures indicated there also at marching posts—Latter have been in bad sanitary condition but now being dealt with systematically.
- (2) *General*.—Officer Commanding, Central Laboratory, Amara, should co-ordinate work at all laboratories in and above Amara. Notes sent with patients often useless or absent. System requires better supervision. Memoranda prepared on laboratory examinations dysentery and enterica and on precautions necessary against hospital infection—Both now circulated to hospitals—Widal tests should be abandoned in T. A. B. inoculated cases—Malaria relapses common arrangements needed for continuance of quinine after convalescence. Comparatively little scurvy occurring Line of Communication but greater attention should be given to dietary of Indians by Officers of Indian units including meat and vegetable in rations drawn. Food supply generally satisfactory. Attention needed to rations at smaller posts. Adulterated

ghi frequently reported. Advise issue run on authority S. M. O. Sweepers up to establishment and good reserve in India being obtained. Additional local establishment of sweepers can be arranged for special places. Flies diminishing, special camp inspections regarding fly breeding places should be organised early spring.

Committee returned Basrah proceeding Nasariah thence Ahwaz.

ACKNOWLEDGMENT AND FURTHER WORK OF THE COMMITTEE.

53. We are specially indebted to Colonel Fell, Deputy Director, Medical Services, Line of Communication, for great assistance in our work and for facilitating our arrangements, as also to Assistant Directors, Medical Services, Special Sanitary Officers, Officers Commanding of Laboratories, hospital and regimental Medical Officers of the area reported on, and to many officers of other branches of the service. We propose, as arranged with the Director, Medical Services, now to visit the forces on the Euphrates and Karun. Meanwhile, we have advised on enquiries to be made as to certain cases of alleged "beri-beri" occurring at Shaiba, and as to plague precautions at Basrah.

We have the honour to be,

SIR,

Your obedient servants,

(Signed) ANDREW BALFOUR, *Lieut.-Colonel*,
R. A. M. C.

„ G. S. BUCHANAN, *Lieut.-Colonel*,
R. A. M. C.

„ J. C. G. LEDINGHAM, *Lieut.-Colonel*,
R. A. M. C.

„ C. M. WENYON, *Lieut.-Colonel*,
R. A. M. C.

BASRAH :

16th December 1916. }

MEDICAL ADVISORY COMMITTEE.

APPENDICES TO REPORT ON LINES OF COMMUNICATION (SHEIKH SAAD TO BASRAH).

NOVEMBER 1916.

1. Dysentery Memoranda for Hospital Medical Officers.
2. Inspections of camp of 72nd F. C. R. E., Amara.
3. Emergency measures for disposal of urine and surface water in Amara during the coming months.
4. Amara Hospitals.
5. Bacteriological Facilities in the Amara area.
6. Inspection of camp of the 13th Division.
7. Miscellaneous matters discussed with Assistant Director, Medical Services, Amara, November 29th.
8. Analysis of causes of sickness at four hospitals in Amara.

The following report was prepared by the Committee on the subject of the proposed amendment to the Constitution of the United States, relating to the election of the President and Vice-President.

NATIONAL ADVISORY COMMITTEE

U. S. DEPARTMENT OF COMMERCE
WASHINGTON, D. C.

APPENDIX TO REPORT ON THE PROPOSED AMENDMENT TO THE CONSTITUTION

NOTES

1. The Committee on the subject of the proposed amendment to the Constitution of the United States, relating to the election of the President and Vice-President, has the honor to acknowledge the assistance of the following members of the National Advisory Committee:
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APPENDIX I.

Dysentery Memoranda for Hospital Medical Officers.

The two following memoranda have been prepared in consultation with the Assistant Director, Medical Services, Amara, and copies forwarded to Director, Medical Services. A memorandum on the treatment of dysentery is being drafted by the Consulting Physicians, Colonel Willcox and Lieutenant Colonel Melville.

A.—SELECTION AND DESPATCH TO THE LABORATORY OF SAMPLES FROM DYSENTERY CASES, AND LABORATORY INDICATIONS FOR TREATMENTS.

1. Adjoining each dysentery section there should be a small fly-proof room in which the bed-pans from dysentery cases may be laid out for inspection by the Medical Officer.

2. Bed-pans which are to receive samples for microscopical or bacteriological examination from hitherto undiagnosed cases should be cleansed so as to remove all trace of disinfectant that may have been used, and finally thoroughly dried. *Urine must not be passed in the bed-pan receiving the fæces.*

3. When a case of dysentery is admitted *in the acute stage*, microscopical examination of a freshly passed sample of the motion should be made before *specific* treatment (serum or emetin) is adopted. The Medical Officer who has inspected the motion should personally select a suitable sample and have it conveyed at once in a suitable *receptacle* (see below) to the hospital pathologist.

4. If active amoebæ (containing red cells) are found by microscopic examination of the sample, emetin treatment may be commenced at once.

5. If amoebæ are not found, and the stool presents the macroscopical and microscopical appearances suggestive of bacillary dysentery, there is no reason to delay the treatment of the case either on specific (serum therapy) or non-specific (*e.g.*, salines in various forms) lines according to the severity of the clinical symptoms (pyrexia, toxæmia, tenesmus, collapse frequency of stools, etc.). A freshly passed sample of the stool should however also be despatched as soon as possible for cultural examination to the *Central Laboratory*, or to the Hospital Laboratory if the latter is fully equipped for cultural work. The demonstration by cultural methods of *B. dysenteriae* (either Shiga or Flexner) in such cases, acts as a useful control to treatment, especially specific serum therapy, and moreover is of high value from the point of view of absolute diagnosis.

6. Samples of fæces should not be sent to the pathologist in *narrow test tubes* or leaky cigarette tins, which are dangerous to fill and handle. A stock of medicine bottles or other receptacles with mouths should be collected and preserved for this purpose. The internal diameter of the neck *should not be less than 1 inch.*

B.—PRECAUTIONS AGAINST SPREAD OF INFECTION IN THE HOSPITAL.

Thorough precautions should always be taken in respect of the following :—

- (a) *Storage, use, and removal of bed-pans and commode pans.*—The bed-pans, etc., after use should *at once* be covered and removed *without spilling* to the place where they are cleansed, disinfected and returned. For dealing with stools required for medical inspection, and with specimens, see directions in (2) above.
- (b) *Soiled linen and bed clothing.*—These should *at once* be put in the vessel containing disinfecting solutions (*e.g.*, 1 oz cresol to 1 gallon) which is kept outside the ward.
- (c) *Handwashing by orderlies, etc.*—Handwashing (with soap and cresol) after handling dirty bed pans, soiled linen, etc., is essential. There should be no distinction in this matter between dysentery and enteric wards. Orderlies who are about to give food to patients or to take their own meals should first wash their hands and use a nail brush. Washing tables, basin, towels, etc., should be placed in a convenient position for use by the orderlies and the routine observance of the above rules consequently made easy. Hot water should be provided as far as practicable.
- (d) *Use of latrines and hand-washing by patients.*—Any latrines which are marked off for walking dysentery and diarrhoea cases should receive special attention as to (1) their seats being kept thoroughly fly-proof, (2) prompt removal of the stools by the sweepers. If such patients are expected to clean their hands after the use of the latrine—a most desirable precaution—a conveniently placed bench with soap, nailbrush, towels, etc., is better than merely putting out a tin of disinfecting solution.
- (e) *Work of sweepers.*—This should be specially supervised both as to methods of cleansing bed-pans, and the immediate and safe destruction of their contents. The latter should, whenever practicable, be emptied straightway into a boiler kept heated for the purpose. If incinerated, the incineration should be immediate, and not involve exposure of the faecal matter to flies, even after chemical disinfection.

(f) *All measures for preventing flies and protection of food* are particularly important in dysentery wards. Medical Officers in charge of dysentery wards should make a point of dealing in detail with the daily practice of the ward in all such matters as the above, and should not be content with assurances that "disinfectant is provided," that "the sweeper sees to it" or similar general statements. The above observations apply also to wards receiving cases of suspected dysentery (colitis, diarrhoea, etc). Such cases should as far as possible be transferred to observation wards in the dysentery section of the hospital. Dysentery and enterica cases should be treated in the same ward.

AMARA :

November 18th, 1916. }

APPENDIX 2.

Memorandum on an Inspection of the Camp occupied by the 72nd Field Company, Royal Engineers, 13th Division.

The Director, Medical Services—

In course of our inspection at Amara we have been struck by the insanitary condition of a camp occupied by the 72nd Field Company, Royal Engineers, 13th Division, and beg to forward a memorandum on this matter by Lieutenant-Colonel Balfour, who visited the camp, in company with the Deputy Assistant Director, Medical Services (Sanitary), Amara, on November 17th. It will be remembered that the Army Commander expressed a wish to be informed of instances of this kind which might come under notice of the Medical Advisory Committee. For convenience and to save time, a copy of the memorandum has been given to-day to the Assistant Director, Medical Services, Amara, and another to the Deputy Director, Medical Services, Line of Communications.

This morning I visited the camp of the above unit accompanied by the Deputy Assistant Director, Medical Services (Sanitary), Amara. The Field Company has been lent by the 13th Division to assist in railway work and has been camped on the ground it now occupies for a period of three weeks. Until the other day the 88th Field Company, Royal Engineers, was also on this site which is on the right bank of the Tigris adjacent to the area occupied by the 1st Battalion, Oxford and Bucks. The Officer Commanding of the latter has complained that these Field Companies were not burning their litter properly and that, as a result, he was being plagued by flies. I found that despite representations from the Deputy Assistant Director, Medical Services (Sanitary), that camp was in a very insanitary condition and that there was a notable lack of sanitary discipline. The sectional cook-houses were dirty, untidy and full of flies. Although receptacles were provided for the use of kitchen refuse, the men were throwing egg shells on the ground, where there were also accumulating partially emptied tins of ration such as butter and other kinds of refuse. The latrines were far too near the kitchens, and for 120 men only 2 latrine buckets were provided. The incinerators were about a quarter of a mile away from the latrines and I was informed that the Officer Commanding had refused to build an incinerator closer to his camp though requested to do so by the Deputy Assistant Director, Medical Services (Sanitary). In the neighbourhood of the incinerators a large quantity of horse litter and manure had been allowed to accumulate. One heap was smouldering. About the rest, insectivorous birds were searching for flies and their larvæ. Ridge incineration had only just been commenced. Flies were present in swarms and there can be no doubt that the complaint of the Officer Commanding, Oxford and Bucks, was fully justified. The incinerators were in a disgraceful state. In the ashpit of that left by the 88th Company there was a pile of dirty jam and meat tins on which flies and hornets were battenning. The same was true in a lesser extent of the incinerator being used by the 72nd Company. No attempt had been made to fire these tins. There has been evidently gross carelessness and neglect on the part of both these units and they have constituted themselves a danger not only to themselves but to their neighbours. The Medical Officer in sanitary charge is not free from blame as he should have been much more strenuous in his efforts to abate the nuisance. At the same time such representations as have been made were ignored except as regards a feeble effort to burn a little manure by the ridge method.

It seems advisable to draw special attention to this state of things especially when neighbouring camps are doing their best to keep down fly-breeding and enforce sanitary regulations.

AMARA:

A. B.

November 18th, 1916.

APPENDIX 3.

Emergency measures for disposing of urine and surface water in Amara during the coming months.

We return herewith Colonel Ewbank's memorandum on Amara drainage, etc. A sheet attached to the papers has unfortunately been lost. It contained a minute from the Engineer-in-Chief approving the proposals generally, and a reference to our Committee for observation on the subject when at Amara. We have now been over the ground, and yesterday the Commandant, the Civil Medical Officer (Captain Winder) and the A. D. W. (Captain Glennie, R.E.) conferred with the Assistant Director, Medical Services, Deputy Assistant Director, Medical Services (Sanitary), and our Committee on the subject. In Amara the disposal of waste matters, especially urine and polluted surface water, presents many difficulties on account of levels, soil, high ground, water, and the use of the Tigris as a source of water supply—either directly or through the shallow wells sunk by the side of the river. We consider the matter here merely as an emergency question—to get something to tide over the period January—April, when rain makes any satisfactory service of sanitary carts impossible and the high river and soil water levels largely prevent disposal in pits. We think the scheme outlined in Colonel Ewbank's memorandum should be accepted in its main essentials, and the work put in hand and pushed on, so as to have the "Sanitary tramways" an accomplished fact by the end of the year. We understand that rails are probably available at Basrah, and that when delivered at Amara the tramways (about 5 miles of 2½ feet gauge) could be laid in the course of two or three weeks. At our conference it was agreed that the tramway should not be delayed pending arrangements to obtain the special receptacles which Colonel Ewbank advises and the Assistant Director, Medical Services, has already asked for. It is important to find out how the supply of these receptacle stands and to expedite it as much as possible. But should it appear that they cannot be expected at Amara by the end of the year, no time should be lost in improvising trucks and receptacles which will temporarily serve the same purpose, with a minimum of spilling. It was also agreed that no delay in the work should be allowed to result from any necessary adjustment of charges between the civil governing authority and the military.

In the following matters of detail we would advise some modification of, or addition to, the scheme outlined by Colonel Ewbank.

1. Left Bank :—(a) *Surface drainage* to the large hollow (about 10 acres) west of the cemetery. It seems practically certain that in the high river period ground water would rise into the hollow so that attempts to pump out the contents of the hollow into the Chahala would fail. The surface water must apparently be left to pond in the hollow. Pumping may however be very advantageous towards the end of the period, when the water level is falling : it is at this time that the greatest offensiveness is likely to occur. Coarse screens may be useful at the points of discharge of the drainage channels, the screened matters being incinerated. Last year much green scum was noticed, which no doubt added to the offensiveness of the ponded area. This might be prevented by periodically dragging bags containing copper sulphate through the water.

(b) *Management of tramway*.—Some one officer (preferably the municipal Medical Officer) should have the control of the whole arrangements which include use of the tramway for town refuse. He will require a foreman and a few men under him to be constantly going round the line and rectifying the minor dislocations. In matters affecting several departments it might be well to have some sort of standing committee which the responsible officer could convene, if necessary.

2. Right Bank :—(a) *Urine, etc., disposal*. We doubt whether the suggested contact bed for urine at the terminus of the tramway would be successful under the conditions of working which have to be provided for. It appears that the land on the far side of the channel to which Colonel Ewbank refers is more pervious than that nearer to Amara, and we think that the urine and screened cook-house waste-water might be disposed of there by running it into surface cuts or into pits with overflow channels just beneath the surface. Should these fail, we think that the risk of direct discharge of urine, etc., into the Tigris at the point in question might be taken, in view of the volume of the river and the arrangements made for chlorinating drinking water at the camps lower down the river. But the former plan is much to be preferred. If there is direct discharge into the Tigris, the addition of chloride of lime to the urine receptacles would be an advantage, as would also coarse screening or filtration (e.g. sawdust).

(b) *Surface drainage*.—It is understood that the surface channels now being cut, to drain to the low-lying area across the line of the old channel, should be completed in about a month, and that there is reasonable probability that here the water will drain away without ponding up.

AMARA :
November 19th, 1916. }

APPENDIX 4.

Memorandum on Hospitals.

The Committee have visited and inspected all hospitals and convalescent depôts in the Amara Area. The latter is a great hospital centre, and rightly so, for it is conveniently situated on the Line of Communications and affords many facilities for hospital work.

The hospitals at present are as follows :—

<i>Left Bank, and Chahala.</i>		Nominal beds.
2	British General Hospitals	500
23	" Stationary "	400
1	" General "	500
42	Indian " (late 27)	500
70	" Stationary "	500
<i>Right Bank.</i>		} Exclusive of Officers.
32	British General "	
12	Indian " "	
21	" " "	
23	" " " (not yet open)	

Officers.

Be's at No. 1 British General Hospital }
 " " 2 " " " } 80?
 " " 32 " " " }

Also "Gorringe" Hospital for Officers, not yet taken into use

Convalescent Depôt.

British	750
Indian	750
Isolation Hospital	250

Hospitals on the left bank of the Tigris are partly accommodated in permanent buildings which have been supplemented by tents and huts. Those on the right bank consist entirely of tents and huts. In the case of the British Convalescent Depôt the latter are of a novel and useful form, large chatai huts having been built over lengthy and deep excavations in the ground.

The Isolation Hospital on the left bank of the Chahala channel is provided with huts and tents, the latter predominating. Some of the hospitals occupy better sites than others and in certain cases the necessity for adaptation to their surroundings has militated against their amenity but, speaking generally, we may say that the arrangements are excellent. The various institutions appeared to us to be well managed and there is a healthy rivalry between them which should make for efficiency. General medical supplies and Red Cross stores are alike ample.

This being so we do not propose to enter into details. Where there has been need for criticism in connection with sanitation we have referred the matter to the Assistant Director, Medical Services, who has promptly dealt with it or has noted it for speedy action. Hence we propose to confine ourselves to those subjects which the Assistant Director, Medical Services, has specially submitted to us for our opinion. These are :—

1. The questions of hutting, drainage and water supply.
2. The new arrangements for making each set of hospitals on either side of the Tigris self-contained so that there may be less delay in loading and unloading patients.
3. Miscellaneous.
4. *Hutting* has to be considered in two separate connections—
 - (a) As regards rain, flooding or such inclemencies of the weather as wind and dust.
 - (b) As regards protection from the sun.

At the present moment we find the situation as regards available beds is approximately as follows :—

	In huts and houses.	In tents,
British	2,680	400
Indian	3,400	1,100

This does not include the *Isolation Hospital* and as the conditions there are somewhat exceptional, we will consider its needs separately and in the first instance.

So far as (a) is concerned the most urgent requirements are (1) that the four existing huts on the British side should have iron roofing, (2) that one hut similarly roofed should be erected on the Indian side, (3) hutting for the stores of hospital bedding and clothing, and (4) minor hutting and roofing, *e.g.*, for cookhouses. These, we understand, are to be undertaken as soon as possible.

As regards (b), we are of opinion that an hospital which admits cholera and febrile cases of acute infectious disease has prior claim in the matter of replacing tents by hutting. The Assistant Director, Medical Services, being in agreement with us on this matter, we may expect that the Isolation Hospital will receive a sufficiency of hutting before the next hot

weather. A reasonable standard would be the provision of huts for half the present nominal bed accommodation.

The tents remaining should be covered with chatai roofing in the hot weather, an interspace being left between the tent roof and the chatai.

Turning to the other hospitals we find that so far as (a) is concerned the most urgent requirements are a new operating theatre at No. 21 Indian General Hospital, where the windows are not glazed or provided with shutters. These requirements have been dealt with in a memorandum by Major G. G. Turner, R.A.M.C. (T.), the officiating Consulting Surgeon. A hut for surgical cases in No. 21 I. G. H. would certainly be an advantage in the wet weather.

The hutting of the hospital wards generally is mainly a question of (b), *i.e.*, protection from the sun. We have gone carefully into the question and have elicited the opinion of those who have had experience of a Mesopotamia summer under canvas.

We fully recognise the desirability of replacing all tentage by hospital huts, specially for British sick, but the requirements of the force in Mesopotamia as a whole have to be considered so far as the supply of wood and matting is concerned. As stated in our report on the Corps area the requirements of the advanced troops should receive every consideration with a view both to the rainy season and the trying summer and, if this is so, there may be a shortage of material for additional hospital huts in Amara.

In the British hospitals the patients are, in the great majority of cases, already housed in buildings or huts, and we do not think that the risk entailed by retaining the present proportion of tents need be serious, provided that the best possible is done to render the tents sun-proof and to keep them cool. Unfortunately, owing to the risk of fire, it is not possible to provide tented wards with electric fans or punkahs while there are great difficulties in obtaining punkah-wallahs for hand-pulled punkahs. Hot-air fans are stated to be not very effective but they merit a trial. In the main, recourse must be had to protecting the tents by chatai matting as was done last summer at No. 2 British General Hospital and elsewhere. In addition to protecting the roof something might be done to shade the sunny sides of a tent by chatai screens and, if labour permits, some modification of khas-khas tattie should be introduced.

When and where the soil water level allows, additional coolness might be secured by pitching the tents over excavations in the ground. If these are made from 2 to 3 feet deep not only is there a gain in height but the patients are more likely to get whatever cool draught may be blowing under the tent flies.

Drainage.—The hospitals will participate in the general scheme for dealing with urine, cookhouse, waste water, etc., by tank carts and sanitary tramway, on which we have already minuted. For certain of the hospitals (*e.g.*, Nos. 1 and 2 British General Hospital) it is specially important that this scheme should be in operation by the beginning of the coming year: otherwise much nuisance and possible risk of infection will arise.

Progress is being made in re-opening old surface drainage channels in Amara for the winter months and in making new drains. This is undertaken by the A. D. W. Department, and branches of these drains have been or are being carried into the hospitals. Except at No. 42 I. G. H., it is expected that the hospital personnel will itself make the necessary subsidiary and tributary channels. This seems reasonable, and in some cases considerable progress has already been made. The personnel of the Isolation Hospital is insufficient to permit of their dealing with the comparatively large area which this hospital covers, and here it is important that, through the R. E. or otherwise, the necessary labour should be found without delay to make the surface drains required.

Water supply.—The speedy completion of the Tigris front piped supply is of the greatest importance to British Hospitals on the left bank. However great the care taken with chlorination, accidents are liable to occur, and the raw water which these hospitals at present draw is exposed in a very high degree to recent and dangerous excretal pollution.

2. *Distribution of cases.*—The scheme devised by the Assistant Director, Medical Services, with a view to lessen the detention of sick convoy steamers at Amara appears to us likely to be very successful. Briefly stated, it secures that the hospitals on each side of the river will be able to deal completely with all the sick brought in by any one steamer. It will be no longer necessary for a P. boat or hospital ship to discharge sick, say, on the right bank, and then have to cross over to the left. Her whole load of officers and other ranks, both British and Indian, whether ordinary cases or cases of the enterica class and of dysentery can, if this scheme is adopted, be put ashore at one landing place. On the right bank the problem is simple, for a slight alteration in one of the hutted wards of No. 32 B. G. H. will provide for an officer's ward and for separate wards for British enterica and dysentery cases, while Indian officers and Indian cases will be taken to No. 12 I. G. H. and No. 21 I. G. H., enterica cases and cases of dysentery going solely to the former.

On the left bank it is more difficult to arrange matters, for accommodation available for officers suffering from enterica and dysentery is at present not too satisfactory in hospitals on this side of the Tigris. If however the Gorrington Hospital for officers, not hitherto utilised, is opened the difficulty will be solved. This building, in many ways well adapted for an

hospital, especially as regards fly-proofing, can take 60 officers including enterica and dysentery cases. The latter can be sufficiently isolated and will then be in comfortable quarters giving the best chances of recovery.

Failing this it would apparently be necessary to continue housing these cases in the upper wards of Norfolk House (No. 2 B. G. H.), in conditions under which these officers must be very closely associated with surgical and other non-infectious cases and where risks of infection within the hospital are considerable. We would, therefore, advise that the Gorringe Hospital be made available. British other ranks will be accommodated in No. 1 B. G. H., No. 2 B. G. H. and No. 23 B. S. H. The last named hospital will take enterica and dysentery cases. Indian cases will be divided between 42 I. G. H. and 70 I. S. H. and Indian enterica and dysentery cases will go to No 42. It is obvious that this scheme, subject to the considerations as regards officer's quarters just referred to, will greatly facilitate the work of the river convoys and prevent needless delay for the steamers.

3. *Miscellaneous* :—Special consideration should be given to the claims of the Central Laboratory for a telephone. To this laboratory are sent specimens from the Isolation hospital as well as from other hospitals, and as the Isolation hospital is a long distance away it is essential, especially when cholera and diphtheria are present, that the Officers Commanding should know the result of the bacteriological examination as soon as possible.

A *Motor Ambulance* would add greatly to the efficiency of the *Isolation Hospital* and, we hope, one will be provided, as also the clinical laboratory which it is proposed to instal there.

The *shortage of Dentists* is a matter not only affecting Amara but the Army as a whole. At present there are two dentists in Amara. When the 13th Division move forward another will become available but, even so, the number is small. One dentist informed us that in a single morning he had to attend to 36 patients and that under these circumstances it was impossible for him to do full justice to his cases. We understand the question of providing more dental surgeons is being considered.

In order to economise bhusa, hospitals are in future to use dried horse or mule litter for the latrine tins and for incineration. Some hospitals (*e g.*, most on the left bank) have little room for drying such litter on the premises, and some need covered storage places for the litter in the rainy season. It would seem best that arrangements for selecting suitable litter and drying it should be made at the place from which the litter for the hospital is drawn (*e. g.*, transport lines), and that these arrangements should be in charge of one of the sanitary sections.

In no case should the faeces from the latrine be allowed to remain about on mixing platforms, etc., pending incineration as we saw at one of the hospitals.

In our memorandum as to dysentery we have already advised on the precautions which should be strictly observed in the hospitals in order to prevent the spread of intestinal infections to patients and staff. The experiences of the present year emphasise the need for such precautions.

AMARA :

November 27th, 1916. }

APPENDIX 5.

Bacteriological facilities in the Amara area.—The Central Laboratory now amply accommodated in a well constructed hut situated in the compound of No. 32 British General Hospital is the only fully equipped laboratory in Amara.

Clinical Laboratories in which microscopical examinations but no cultural work can be undertaken are available at 12 Indian General Hospital, 21 Indian General Hospital, 42 Indian General Hospital, 2 British General Hospital, 23 British General Hospital, and 32 British General Hospital (the equipment of the last being housed in the Central Laboratory whose resources are at the disposal of the Hospital Pathologists) but at three only of these hospitals, namely, 12 Indian General Hospital, 2 British General Hospital, and 32 British General Hospital, are there full-time pathologists.

At No. 1 British General Hospital there is no pathologist and no suitable laboratory accommodation has been provided. At No. 70 Indian Stationary Hospital a clinical laboratory it being got ready. In view of the proposal to instal completely equipped laboratories at No. 1 British General Hospital, No. 2 British General Hospital, No. 32 British General Hospital and No. 12 Indian General Hospital, when the equipments cabled for from England arrive in Mesopotamia, it is most important that steps be taken in advance for the suitable housing of these equipments at the respective hospitals and provision made for heating, lighting, and water supply. Adequate provision must consequently now be made for the maintenance of current supplies to replace wastage in these additional complete laboratories, as also in the Central laboratory and the various clinical (or second class) laboratories in the area, as we have found this to be the crying need in the Mesopotamia laboratories generally. At the Central Laboratory the deficiency of glassware generally, and particularly of Petri dishes, is so grave that at the present time the cultural examination of excreta in dysentery and enterica can be undertaken only on a very meagre scale. Ample supplies of glassware and requisites for media making are urgently required. These defects will be met, but only temporarily, by the arrival of the supplies recently cabled for on our recommendation from England.

It is important that at the Central Laboratory an adequate supply of laboratory animals, guinea pigs, rabbits and monkeys should be available. We understand that permission to procure these animals from India has not been sanctioned, but we are unable to see on what grounds any objection can be taken. These animals cannot be obtained in Mesopotamia, and at present only a few guinea pigs which originally came from France are housed at the Central Laboratory.

The supply required is small, and there is already accommodation at the laboratory for the animals wanted. They may at any time be needed urgently for the detection of plague, or as the final test of other infections, and may be invaluable for working purposes in connection with the prevention of diseases such as infective jaundice, the diagnosis of which may necessitate animal experiment.

In other areas, *e.g.*, Salonica, where laboratory animals cannot be procured locally, a supply has been obtained from Egypt.

When complete equipments for No. 1 British General Hospital, No. 2 British General Hospital and No. 12 Indian General Hospital arrive, provision will require to be made for additional personnel and the problem of securing adequate subordinate personnel and will become acute unless steps are taken to second from other units men of the "B class" known to have had some training in laboratory work. It may be necessary, for example, owing to lack of subordinate personnel, to have media for these additional laboratories prepared at the Central Laboratory and in this connection we would draw attention to a request by Major Mackie of the Central Laboratory for the services of a highly trained media maker now employed as a pack store Havildar at the cholera camp in Basrah. This request, we hope, will be promptly complied with.

Bacteriological diagnosis of Enterica and Dysentery.—The bacteriological diagnosis of enterica has rested mainly on Widal tests and to a lesser extent on blood cultures, Para A infections predominating here as elsewhere. Transfer enterica cases from up river reach Amara at a stage when blood cultures are not likely to yield positive results. With the establishment of a laboratory at Sheikh Saad, however, this difficulty should in great measure be met. In all cases of suspected enterica arising locally, we would urge the earliest performance of blood cultures during the first ten or twelve days of the pyrexial period and would advise that Widal tests should be abandoned in all cases giving a record of inoculation with T. A. B. vaccine.

If the blood culture yields a negative result it may be possible in many cases to repeat this test but if again unsuccessful the faeces and urine should be examined culturally (preferably about the end of the second and the beginning of the third week). However, until the Central Laboratory acquires a larger stock of glassware and media making materials, the cultural examination of excreta on a large scale cannot be undertaken. We would urge in this connection the closest possible coordination between the bacteriologist and the clinician in all cases demanding bacteriological enquiry. We understand that T. A. B. vaccine is now being pushed fairly generally—the 13th Division, for example is stated by its Assistant Director, Medical Services, to have been practically complete as to T. A. B. inoculation at

the end of October—and, therefore, every attempt should be made to establish the diagnosis by isolation of the causative organism, and obtain as much information as possible regarding the protection being afforded by T. A. B. vaccine. It is important for this purpose that the clinical notes made on enterica cases at the hospitals should be as full and the records made there as to inoculation (whether from the pay-book or from the man's statement, or both) as exact as possible. These notes and records should be available to the Officer in charge, Central Laboratory, for purposes of examination and analysis.

Dysentery.—From data obtained at the Central Laboratory and elsewhere it would appear that the dysentery has been mainly of bacillary type though amoebic cases undoubtedly occur both in Indian and British troops and not a few cases of tropical liver abscess have revealed themselves.

During our stay in Amara Lieutenant-Colonel Wenyon has given demonstrations at the Central Laboratory to all pathologists desiring to be informed in the matter of identifying intestinal protozoa, especially the vegetative forms and cysts of *Entamoeba histolytica*. These pathologists at the various hospitals will, therefore, in future be better able to carry out the microscopical examination of the stools and the indiscriminate use of emetin will be avoided (See our memorandum on selection of samples and indications for treatment arising from laboratory diagnosis).

GENERAL RECOMMENDATIONS.

When the bacteriological equipments allocated to the area arrive, Amara will become a very important centre of laboratory work and we are strongly of opinion that the efficiency of that work would be greatly enhanced extending the sphere of work of the Officer in charge, Central Laboratory, to include that of consulting bacteriologist for the area. In this capacity he would co-ordinate the work in the various laboratories, supervise the maintenance of current supplies, collect bacteriological statistics and advise the Assistant Director, Medical Services (Amara), as well as the Director, Medical Services, in all matters requiring bacteriological enquiry or affecting bacteriological personnel, etc.

We would suggest also that arrangements be made by which Major Mackie might visit Sheikh Saad and Arab Village occasionally and so maintain an active touch between bacteriological workers in Amara and other centres up river. As Major Mackie is associated with the Sanitary Committee and his services are not definitely allocated to the Assistant Director, Medical Services, Amara, we imagine that this arrangement would not create any administrative difficulty. If our suggestion is approved, we would recommend its early adoption so that adequate provision may be made in advance for the housing of the additional equipments allocated to this area and Sheikh Saad, and for the procuring of personnel to run these laboratories. The Central Laboratory should also, as soon as possible, be linked up on the telephone system so that the issue of reports may be expedited and a closer touch maintained between it and the hospitals.

There is ample accommodation at the Central Laboratory for a large stock of current bacteriological supplies on which, when available, the bacteriologists, both here and at Sheikh Saad and Arab Village, should have power directly to indent. It would be one of the functions of the consulting bacteriologist to maintain the supply.

Medical Stores.—We have inspected the Medical Stores at Amara and are in full agreement with the recommendations contained in the recent report to the Assistant Director, Medical Services, by Major Turner. In that report Surgical Stores are fully dealt with and attention is drawn to the urgent necessity for increased accommodation for the subordinate personnel. The danger of fire is great as the Indian servants cook their food in open fires in close proximity to inflammable materials, such as ether, etc. The stock of therapeutic sera is good and supplies are being maintained. All sera should be kept in ice boxes and a daily supply of ice should be provided. We were informed that calf lymph frequently arrives in Amara from Basrah at a date later than three weeks from its issue in India. It comes from Basrah by parcel post.

If sent from Bombay in cold storage (*e.g.*, at 50 C.) and maintained similarly in Basrah, deterioration of the lymph would be avoided.

It is of course very important that, in the event of an outbreak of small-pox, satisfactory lymph should be available. If we may judge by the results of recent vaccination of children at the Amara Central Dispensary with lymph obtained from the Advanced Medical Stores, Amara, this is hardly the case at present. Complete failures were reported in at least 16 out of 86 primary vaccinations of children under 5 years of age, the vaccinations being done by an experienced vaccinator who previously has had much better results.

At present the lymph is sent from India by parcel post. It would be well to enquire at once whether some more expeditious method of despatch and storage during the voyage (*e.g.*, by hospital ship, with special arrangement for storage in an ice chest) can be arranged.

Dated 28th November 1916.

APPENDIX 6.

Inspection of Camp of the 15th Division.—On November 22nd we visited the camp of the 13th Division, about 2 miles above Amara, which has been occupied by the force for 2 months. The Assistant Director, Medical Services, of the Division, Colonel Morton, A. M. S., Major Skelton, Deputy Assistant Director, Medical Services (Sanitary), and Captain Kneebone, Officer in charge of the Divisional Sanitary Section, came with us around the camp and gave us every assistance. Owing to the impending departure of the Division we limited our inspection to one or two representative units in each brigade, and to Divisional arrangements.

Generally speaking, the sanitary condition of the camp was good and the lines were clean, although, owing mainly to accumulation of horse litter outside the camp, flies were excessive.

The arrangements for purification of the Tigris water and its collection and distribution from a central station were excellent. Latrines were in most cases satisfactory and incineration of faeces and disposal of wet refuse was being well carried out. In one part of the camp sullage water was being successfully disposed of by running into reticulation channels.

The following points arising out of our visit may be noted :—

1. *Use of Indian Sweepers.*—In certain cases there was too much dependence on the Indian sweeper for work in the lines. In these cases, food refuse was lying about or half buried in ground about the tents, and its presence was excused on the ground that the sweeper had not come for it, or would shortly come for it, or that the tent had no sweeper. Now in ordinary cases the sweeper personnel is barely enough to attend properly to latrine and incinerator area ; at the most, if the sweeper goes into the lines, it should be to collect tins or sacks of refuse put outside the tents ready for him to take away. The men themselves should deposit all scraps, food cans, etc., in a covered tin or sack outside the tent. To leave or throw such refuse in or about the tents should be regarded as bad sanitary discipline to which the attention of the Officer Commanding's units should be drawn, and appropriate action taken.

2. *Cleansing of food utensils, mess tins, etc.*—Units would do well to provide, wherever possible and in a convenient place, some form of trough, tank, or other receptacle for water, with a grease-trapped soak pit adjoining, where men can clean their food utensils after taking meals in the tents, and wood ash or sterilised sand can be provided. Present arrangements for this purpose were usually unsatisfactory and invited food contamination and its attendant risks. All food refuse tins should be kept covered, preferably with weighted sacking.

3. *Latrines and incinerators.*—These were as a rule satisfactory, but in certain units delay in incineration led to an accumulation of faecal matter by the side of the incinerator, to which flies were attracted.

4. *Horse manure and litter*—had been permitted to accumulate unburnt in the dumping area outside the camp, where it formed a fly-breeding centre. With the object of disposing of this surplus, the Division arranged about a fortnight ago to cart it to the Chahala and throw it into the river. The Assistant Director, Medical Services, Amara, had agreed, reluctantly and subject to certain stipulations, to the experimental trial of this arrangement, but it soon became evident that the system was a very undesirable one, leading (as we observed on selves) to the accumulation of large banks of fly-producing refuse by the side of the river, to general nuisance, and to casting into the river, or its banks, quantities of waste food tins, bottles and all sorts of rubbish which should have been incinerated. The practice had consequently been terminated at the date of our visit.* The accumulation in question could probably have been prevented by the free use on the dumping ground of open con-
"American" incinerators as described in our report on the Corps area, or by stacking the litter in mounds after preliminary drying and covering over daily with earth. These and all other anti-fly methods might usefully receive attention in future camps occupied by this Division for any length of time : there was very considerable fly nuisance in the camp, and consequent risk of spread of dysentery and other diseases carried by these insects.

5. *Food.*—The food supplied seemed generally good and to ration scale. Large quantities of Hardmen's biscuits lately issued had been found full of weevils ; many men also object to this brand of biscuit on account of their great hardness. We were informed that any unit to which tins of such weeviled biscuits have been issued can get them exchanged at once for good biscuits. Owing to shortage of sheep, beef alone is issued as the fresh meat ration. The quality is said to be very poor and tough—a condition to be expected from the appearance of the cattle which we have seen being driven in. On this matter, as on the bad quality of a large amount of tinned rabbit and pineapple lately issued as a ration, we hope to obtain further information from the Supply and Transport Dépôt, Amara. Some regiments had taken much trouble to build ovens, flues, etc., and to vary meals as much as possible : others seemed to give only a daily routine meat stew. The few units which possessed field cookers had the advantage in this respect. As pointed out in our report on the 3rd Indian Army Corps, the more general use of field cookers would be a great advantage : we understand they have already been asked for in the 13th Division and hope it will be possible to expedite the supply.

* So we were informed. But two days later (November 24th) it was still in full swing : the matter obviously calls for further inquiry and immediate instruction.

Field Ambulances, which may have special occasions for cooking quickly, would also increase their efficiency if they possessed field cookers. The Expeditionary Force canteen at this camp has had large sales and most of its new supplies have on each occasion been rapidly sold out.

Water carts.—The few units which possessed water carts have been at great advantage in regard to the carriage and storage of water. Most of the units carried water from the central station in packals to tarpaulin tanks in the lines. Apart from the extra labour involved, the method exposes the water to considerable contamination by dust. The same considerations seem to apply to water carts as to field cookers.

Other Supplies.—The Supply and Transport Depot had no cresol, and the Sanitary Section for some time past has obtained only very small quantities, if any. The Division does not possess any satisfactory disinfecting apparatus, and the season is approaching when lousiness is common, so that it is important that this deficiency of cresol should be made good as soon as possible. The supply of Acid Sodium Sulphate tabloids, for emergency water purification in men's bottles, will receive attention (see Corps report—cholera section).

Prevalent disease.—The recent rates have been comparatively low, most of the sickness has been due to septic or "trench" sores, and to diarrhoea, as a rule curable without recourse to the field ambulances. 57 cases of dysentery and 52 of the enterica group have been reported in the 3 weeks ended November 14th: they have been generally distributed throughout the Division. T. A. B. inoculation was practically completed in the Division by mid-October. A large proportion of the Division consists of recent drafts, which include new men sent out from home and also men now returning from India, Egypt, etc., after having been sent away sick. There has been practically no cholera since the April outbreak (252 cases and 105 deaths). A few cases of jaundice have lately occurred—there was a sharp epidemic of jaundice in June and July (555 cases).

Sandfly fever—caused much sickness up to October; vermijelli has been found a useful repellent of the sandfly but the amount available for issue has been small. We think that in the next Sandfly period vermijelli might be made a general ration issue and not (as at present) supplied only through medical stores.

Heat stroke and effects of heat.—As the 13th Division suffered very heavily from these causes in the summer, we obtained the opinion of the Assistant Director, Medical Services, and others as to measures which would be taken to reduce this cause of sickness in the coming summer. One of the main causes, the arrival in the hot weather of new drafts coming straight out from England, has already been referred to in a previous report (3rd I. A. C.). It appears that drafts arriving after May by the time they reached the Division, were seldom worth sending. Apparently helmets were often lost, or damaged, or of unsatisfactory quality and could not be replaced. A reserve supply of satisfactory sun helmets will be important for next year. The absence of any E. P. I. P. tents until the end of the summer was also a very important factor. We have referred in the Corps report to the importance of a supply of ice being available for treatment of heat stroke. In the absence of ice a stock of spirit for making an evaporating lotion might be of benefit. We understand that spine pads and smoked glasses were generally available. On the subject it is worth noting that out of a personnel of 63 men employed in tents in the divisional bakery there were 15 cases of heat stroke and 7 deaths: the men manipulating the dough suffered specially.

Arrangements for moving camp, etc.—The Assistant Director, Medical Services, explained to us the measures to be taken to secure sanitary conditions on the march, and to leave the present camp and its surroundings in a satisfactory condition, all of which, apparently were being well considered.

AMARAH.

November 25th, 1916.

APPENDIX 7.

NOTES ON MISCELLANEOUS MATTERS DISCUSSED WITH THE ASSISTANT DIRECTOR, MEDICAL SERVICES,
BEFORE LEAVING.

29th November 1916.

1. *Enterica in men inoculated with T. A. B.*—It will be important to keep as complete a record as possible of the individual instances in which men inoculated with T. A. B. vaccine have been attacked by typhoid, paratyphoid A. and paratyphoid B. respectively. Existing notification arrangements in Amara will permit of this being done at the Central Laboratory by Major Mackie who is prepared to take it in hand. It will be necessary (a) that hospitals send the Central Laboratory any clinical or other notes required for this purpose, (b) that the entry in the present notification form under "whether triple vaccine used" should show if this is taken from pay-book entry or from the man's statement only.

2. *Notification of enteric group in transfer cases.*—These are required to be sent weekly by the hospitals to the Deputy Assistant Director, Medical Services (Sanitary). It is important that the hospitals should send such notifications promptly on the diagnosis being made, and in all cases, so that the information may be passed on without delay by the Assistant Director, Medical Services, to the Assistant Director, Medical Services of the Division concerned or, if this is not known, to the Deputy Assistant Director, Medical Services (Sanitary) General Headquarters.

3. *Dysentery*—Apparently it is thought that slight cases of true dysentery, cured in Amara and ready to return to duty, can only be sent back to their (units without first going to Basrah) if they are termed "Colitis" and the word dysentery is not employed. It seems better to use the correct descriptive term, and deal with each dysentery case on its merits, as regards direct return to duty.

4. *Diagnosis of medical cases entered in admission and discharge books.*—The practice of the hospitals varies; it seems preferable that the disease entered in the book should be the diagnosis of the medical officer in charge of the case at the hospital. The practice of invariably entering the diagnosis which comes with the patient, and only altering it in special cases by the formality of readmitting the case, has little to recommend it, though it may be officially correct.

5. *Notes going with patient on transfer*—L. of C. have requisitioned large envelopes to be given to each patient with all the non-confidential documents, including temperature charts which relate to his case at the various stages of his transfer. Pending the arrival of the envelopes, all these documents should be put together and sent with the individual patient on his transfer:—not in a bundle which accompanies the nominal roll.

6. *Red Cross Launches.*—It was understood that difficulties in local transport of sick arising from the break-down of some Red Cross launches and the dispatch of others to the front will be met as far as possible by obtaining 5 motor ambulances from Basrah.

7. *Municipal.*—The following points, which had already been discussed with Captain Winder, R.A.M.C., came up for consideration *viz.* (a) Captain Winder's work at the British Advanced Depôt. The appointment of a trained British Inspector to his Sanitary Staff. Captain Winder has now fewer duties at the British Advanced Depôt. His place has been taken by a junior Medical Officer and Captain Winder now exercises only a general supervision. This will give much greater time for his duties as Medical Officer of Health.

It was agreed that it is very desirable to attach a trained British Sanitary Inspector to Captain Winder. An effort is to be made to secure such an Inspector.

(b) The Municipal Public Latrines and the Town Scavenging. The present system of public latrines leaves much to be desired, chiefly because it is very difficult, even at a high rate of pay to secure good Arab sweepers. There is thus apt to be a dangerous accumulation of faecal material in the pans, and on this, flies feed in large numbers. We have suggested that an immediate trial should be made both of ordinary cess-pits like those used by the natives and of so called "oil-pits."

In the case of the former the contents are removed periodically by the special sweeper class who deal with the native cess-pits.

In the latter a perforated sheet of corrugated iron traverses the pit about one foot from the bottom. Oil is added and floats on the surface of the urine. Whatever combustible material is available is added to the contents of the pit above the corrugated iron and the pit is fired. The heat of the blazing oil evaporates the urine, the combustible material takes fire and the contents are either wholly incinerated or so charred that they are no longer dangerous or attractive to flies. This burning can be done twice a day. To prevent the ingress of sub-soil water in the rainy season the oil-pit can be steined with brick set in cement. Captain Winder is to try a couple of the cess pits and one oil-pit as soon as possible and will report upon their efficiency. As regards scavenging, we agreed that the present refuse bins had better be continued but that an effort should be made to secure others of a better type, to be set on cement platforms so that fouling of the ground may be avoided as far as possible.

Carts are being provided and will take the place of the donkey sacks at present in use.

(c) Chahala dump (pier, screen, incinerator).

We were informed that arrangements were being made to provide a proper pier, screen and incinerator at the Chahala dump. The sullage and urine will then be discharged into the stream well free of the bank and soiled matter will be retained by the screen and can be burned on the spot.

8. *Malaria*—Formation of Mosquito Brigade.

While anti-mosquito work within camp precincts and on steamers and boats can be carried out by trained men of the Sanitary Sections it will be necessary to provide a small mosquito brigade to deal with breeding places in the town and amongst the irrigated and swampy localities outside it. Arabs take kindly to this work and their keen sight aids them in detecting the most minute larvae. A small brigade of four or five under an overseer, if properly trained, should be quite sufficient to deal with all breeding places. The equipment necessary for such a brigade is a small item and consists merely of a supply of oil, a few sprays, some poles and rags, collecting tins or dipping ladles fixed to sticks and some wide mouthed bottles. Where flooded borrow-pits, river pools or large water collections have to be dealt with, it will be advisable to indent for such labour as may be required. The mosquito brigade should be formed not later than March 1917 as apparently mosquitoes and especially anophelines start breeding early in April. Trap pools are likely to be useful in a place like Amara.

9. *Sanitary Sections*.—The British Sanitary Section (No. 100) arrived in Amara about three weeks ago. Unfortunately nearly all its equipment was left in Basrah and it is essential that it should be forwarded as soon as possible. It is now possible to divide the sanitary work between this Section and No. 17 which is an Indian Sanitary Section. The latter which has no Royal Army Medical Corps personnel should concern itself, as at present, with the methods for the collection and disposal of excreta, urine and sullage waters, the burning of horse litter and refuse and, in emergencies, the general scavenging and cleaning up of camp precincts. It should also continue to deal with boats and steamers. The British Section, having trained Royal Army Medical Corps personnel, is best employed on inspection work. This is a crying necessity in Amara where there are many holes and corners apt to escape notice and a large area which requires constant supervision. In addition the more expert sanitary work such as water chlorination, food and milk inspection, the surveillance of slaughter houses, disinfection, etc., would fall to its share as indeed has already been arranged.

10. *Fly Expert*.—It is understood that the position and duties of the fly expert in Amara are under discussion with the Director, Medical Services, at the present moment. If he continues available at Amara his services should specially be utilised in the way of instruction. He should deliver lectures on fly breeding and prevention to all concerned and supplement the theoretical instruction by practical demonstration in the field. His work should be systematised under the direction of the Assistant Director, Medical Services, so that he inspects and reports upon definite areas and indicates what measures should be taken to prevent, diminish or abolish the fly nuisance. He should be responsible for different kinds of fly traps used, see that they are properly constructed and employed and advise generally regarding them. His services should be available for the Municipality as well as for the Army.

It is of the utmost importance that in the early Spring every effort should be made to combat the fly danger and stringent measures should be taken with such units as are careless or idle in this respect.

11. *Clayton Machines*.—Have been asked for; it would be well to establish them at the two general ablution places (left and right bank) which are to be set up, and so have ready means of rapidly disinfecting clothing and blankets of regiments or other units of the Defence force, in the event of louse-borne disease appearing or lice becoming common. Failing the arrival of the Clayton machines, shift would have to be made with tubs of dilute cresol and soft soap solution.

12. *TIGRIS FRONT WATER SUPPLY*.—As soon as this service is available chlorination of the whole supply should be undertaken in the supply tanks and not left to individual units.

13. *Rations of Indian troops*.—The Committee had brought to the notice of Major Watts, Officer Commanding, Supply and Transport Depôt, evidence that some of the Indian units are not receiving their vegetable ration on the winter scale of 6 oz. per day, but in much lower quantities such as 2½ or 3 oz. It appeared that 6 oz. per day can be supplied for 5 days out of 7 and that the shortage can therefore be remedied without difficulty when its causes have been ascertained. It would be well that the return of daily rations supplied to the Assistant Director, Medical Services, weekly for transmission to the Director, Medical Services, should in future be carefully looked over as regards the above or similar deficiencies. The Indian Advanced Depôt at present is the only Indian unit making this return; it is advisable that another unit, e.g., a regiment of defence troops, should also give similar particulars. The Committee in their visits to Indian units, and in an interview with the Commandant, Amara, emphasised the importance of the Officer Commandings, Quartermasters, and Medical Officers being fully conversant with the nature and quantity of the rations taken and consumed by the men, and securing that they obtain the supplies which are available from the Supply and Transport Depôt.

AMARA :

The 30th November 1916. }

APPENDIX 8.

No. 1 BRITISH GENERAL HOSPITAL (AMARA).

*Analysis of Discharge Sheets from September 1st to 11th October 1916.**Local cases—*

Sandfly fever	205
Enteritis	104
Dysentery	40
Diarrhoea	17
Colitis	9
Malaria	76
Cellulitis	71
Debility	29
Enteric Group	27
Para-typhoid	8
Eye	19
Gastric	17
Rheumatism	17
Cholera	16
Wounds	16
Pulmonary	14
P. U. O.	11
Miscellaneous	105
Total	801

Transfer cases—

Debility	42
Enteritis	17
Dysentery	12
Diarrhoea	4
Colitis	2
Eye	34
Malaria	20
Venereal	14
Pulmonary	10
Enteric Group	7
Para-typhoid	1
Sandfly	7
P. U. O.	5
Jaundice	5
Tonsillitis	9
I. C. T.	7
Heart	8
Cholera	1
Miscellaneous	32
Total	237

Total analysed 1,038.

No. 32 BRITISH GENERAL HOSPITAL (AMARA).

*Analysis of Discharge Sheets from August 27th to October 27th, 1916.**Transfer cases only.*

Diarrhoea	204
Dysentery	160
Colitis	12
Enteritis	3
Enteric Group	129
Para A.	70
Para B.	9
Malaria	173
Debility	156
I. C. T.	101
Sandfly fever	56
Effects of heat	49
Wounds and injuries	38
Pulmonary	35
Tonsillitis	33
Gastric	26
Jaundice	25
Myalgia	21
Piles	19
Venereal	16
Eye	15
Hernia	15
Heart	13
Nerves	12
Synovitis	11
Ear	11
Skin	5
Diphtheria	3
P. U. O.	1
Beri beri	3
Liver abscess	2
Scurvy	1
Miscellaneous	43
Total	1,470

12TH INDIAN GENERAL HOSPITAL (AMARA).

Analysis of Discharge Sheets from 15th September to 29th October 1916.

<i>Local cases (Fighting men).</i>				<i>Transfer cases (Fighting men).</i>			
Colitis	38	} 47		Scurvy	168	} 151	
Dysentery	6			Colitis	93		
Diarrhoea	3			Dysentery	41		
Jaundice	21			Diarrhoea	17		
Scurvy	9			Anaemia	52		
Eye	7			Malaria	33		
Malaria	5			Jaundice	20		
P. U. O. . . .	4			Ent. Group and Para	18		
Para-typhoid	4			Pulmonary	14		
N. Y. D. . . .	3			P. U. O. . . .	14		
Pyorrhoea	2			Eye	14		
Anaemia	3			Pyorrhoea	11		
Miscellaneous	14			N. Y. D. . . .	17		
Total	119			Wounds	14		
				Cellulitis	13		
				Miscellaneous	62		
				Total	602		

21 INDIAN GENERAL HOSPITAL (AMARA).

26th September to 30th October 1916.

<i>Local cases (Fighting men).</i>				<i>Local cases (Followers).</i>			
Scurvy	77	} 79		Pulmonary	42	} 42	
Dysentery	10			Venereal	44		
Diarrhoea	47			Diarrhoea	28		
Colitis	22			Dysentery	3		
Anaemia	42			Colitis	11		
Injuries, etc. . . .	36			Scurvy	25		
Skin	29			Injuries, etc. . . .	23		
Malaria	25			Malaria	19		
Cellulitis	22			Cellulitis	15		
Debility	23			Anaemia	15		
Pulmonary	22			Rheumatism	14		
Venereal	16			Sandfly	14		
Eye	14			Jaundice	10		
Rheumatism, etc. . . .	12			Skin	17		
Sandfly	8			Eye	8		
Ulcers, etc. . . .	10			Enterica	2		
Jaundice	7			Miscellaneous	45		
Enterica	2			Total	335		
Miscellaneous	40						
Total	464						

Total Indian cases analysed 1,520.

